

SN 09/298,297

Docket No. S-91,732

In Response to Office Action dated May 25, 2005

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Currently amended) A method for generating materials which exhibit photoinduced charge transfer having a controlled direction, which comprises the steps of:

(a) depositing a donor layer directly onto a substrate, the substrate consisting of non-conductive glass;

(b) depositing a nonlinear optical material directly onto the donor layer;
and

(c) depositing an acceptor layer directly onto the nonlinear optical material; and

(d) self-assembling the donor layer, the nonlinear optical material layer, and the acceptor layer into a superlattice, whereby photoinduced charge transfer is achieved between the donor layer and the acceptor layer, thereby enhancing the nonlinear optical properties of the nonlinear optical material.

2. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 1, wherein the donor layer and acceptor layers are selected from the group consisting of conjugated polymers, fullerenes, porphyrins, and phthalocyanines.

3. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 2, wherein the conjugated polymers include conjugated polyelectrolytes.

4. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 2, wherein the

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conjugated polymers include the water-soluble, anionic form of poly(2,5 methyl-propyloxy sulfonate phenylene vinylene).

5. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 2, wherein the fullerenes include functionalized derivatives of C₆₀ having ionic groups such that the fullerenes are rendered water-soluble.

6. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 1, further including the step of inserting at least one transparent spacer layer between neighboring donor and acceptor layers, such that self-quenching is eliminated.

7. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 6, wherein the at least one transparent spacer layer includes poly-electrolytes.

8. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 7, wherein the poly-electrolytes are selected from the group consisting of: poly(ethylene-imine), poly(allyl-amine hydrochloride), poly(di-allyl-amine), poly(styrene sulfonate) and poly(propylene-imine) dendrimers.

9. (Canceled)

10. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 1, wherein the donor layer, the acceptor layer, and the nonlinear optical material layer are deposited using ionic self-assembly from aqueous solution.

11. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 10, wherein the

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conformation of the donor layer is controlled by varying the pH of the aqueous deposition solution.

12. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 1, wherein the nonlinear optical material includes polymers having nonlinear optical chromophores as side-chain substituents to the polymer backbone.

13. (Original) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 1, wherein the nonlinear optical material includes PAZO.

14. (Currently amended) A method for generating materials which exhibit energy transfer having a controlled direction, which comprises the steps of:

(a) depositing a donor layer directly onto a substrate, the substrate consisting of non-conductive glass;

(b) depositing a transparent spacer layer directly onto the donor layer;
and

(c) depositing an acceptor layer onto the transparent spacer layer; and

(d) self-assembling the donor layer, the ~~nonlinear optical material~~ transparent spacer layer, and the acceptor layer into a superlattice, whereby energy transfer is achieved between the donor layer and the acceptor layer.

15. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 14, wherein the donor layer and acceptor layers are selected from the group consisting of conjugated polymers, fullerenes, porphyrins, and phthalocyanines.

16. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 15, wherein the conjugated polymers include conjugated polyelectrolytes.

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17. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 15, wherein the conjugated polymers include the water-soluble, anionic form of poly(2,5 methyl-propyloxy sulfonate phenylene vinylene).

18. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 15, wherein the fullerenes include functionalized derivatives of C₆₀ having ionic groups such that the fullerenes are rendered water-soluble.

19. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 14, further including the step of depositing a layer of nonlinear optical material onto the donor layer and the step of depositing a transparent spacer layer between the nonlinear optical material layer and the acceptor material.

20. (Previously presented) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 19, wherein the nonlinear optical material includes polymers having nonlinear optical chromophores as side chain substituents to the polymer backbone.

21. (Previously presented) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 19, wherein the nonlinear optical material includes PAZO.

22. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 14, wherein the at least one transparent spacer layer includes poly-electrolytes.

23. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 22, wherein the poly-electrolytes are selected from the group consisting of: poly(ethylene-imine), poly(allyl-amine

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hydrochloride), poly(di-allyl-amine), poly(styrene sulfonate) and poly(propylene-imine) dendrimers.

24. (Canceled)

25. (Previously presented) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 14, wherein the donor layer, the acceptor layer, and the transparent spacer layer are deposited using ionic self-assembly from aqueous solution.

26. (Original) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 25, wherein the conformation of the donor layer is controlled by varying the pH of the aqueous deposition solution.

27. (New) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 1, wherein the donor layer comprises poly(2,5 methyl-propyloxy sulfonate phenylene vinylene), the nonlinear optical layer comprises PAZO, and the acceptor layer comprises at least one fullerene.

28. (New) The method for generating materials which exhibit photoinduced charge transfer having a controlled direction as described in claim 27, further including the step of inserting at least one transparent spacer layer between neighboring donor and acceptor layers, wherein the transparent spacer layer comprises at least one of poly(ethylene-imine), poly(allyl-amine hydrochloride), poly(di-allyl-amine), poly(styrene sulfonate), and a poly(propylene-imine) dendrimer.

29. (New) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 14, wherein the donor layer comprises poly(2,5 methyl-propyloxy sulfonate phenylene vinylene), the transparent spacer layer comprises at least one of poly(ethylene-imine), poly(allyl-amine hydrochloride), poly(di-allyl-amine), poly(styrene sulfonate), and a poly(propylene-imine) dendrimer, and the acceptor layer comprises at least one fullerene.

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30. (New) The method for generating materials which exhibit energy transfer having a controlled direction as described in claim 14, further including the step of depositing a layer of nonlinear optical material onto the transparent spacer layer and the step of depositing a second transparent spacer layer between the nonlinear optical material layer and the acceptor material.